Patent Claims

1. A hydrodynamic coupling (1.1) with a primary impeller (1);

1.2 with a secondary impeller (2);

1.3 the primary impeller (1) and the secondary impeller (2) together form a toroidal working chamber (3);

1.4 the primary impeller (1) is disposed on a drive shaft (4) or is formed as an integral part of it;

characterized by the following feature:

1.5 at least one supply channel (5) for introducing working medium into working chamber (3) and at least one evacuation channel (6) for the simultaneous evacuation of working medium from working chamber (3) are formed in drive shaft (4).

2. The hydrodynamic coupling according to claim 1, further characterized in that the at least one supply channel (5) and the at least one evacuation channel (6) run at least over a prespecified segment in the axial direction in drive shaft (4), wherein the at least one evacuation channel (6) is disposed on a larger circumference than the at least one supply channel (5).

3. The hydrodynamic coupling according to claim 2, further characterized in that, from the axial end (4.1) of the drive shaft (4), which is located at a distance from working chamber (3), up to at least almost the other end of the drive shaft (4), the supply channel (5) is formed in the shape of a central channel for working medium on the lengthwise axis of the drive shaft (4), and is surrounded by a plurality of evacuation channels (6), which are provided radially on the outside.

4. The hydrodynamic coupling according to one of claims 2 or 3, further characterized in that the evacuation channels (6) open up into the working chamber (3) in a region of the outer circumference (3.3) and the supply channel (5) opens up into the working chamber (3) in the region of an intermediate circumference (3.2), which is located near the face center between the inner circumference (3.1) and the outer circumference (3.3) of working chamber (3), particularly in the form of a plurality of inlet openings.

5. The hydrodynamic coupling according to one of claims 1 to 4, further characterized in that the primary impeller (1) and the secondary impeller (2) are each mounted in a floating manner on a shaft (4, 7).

6. The hydrodynamic coupling according to one of claims 1 to 5, further characterized in that the primary impeller (1) can be mechanically locked against rotation, so that the hydrodynamic coupling exercises the function of a retarder in the case of the driven secondary impeller (2).

7. The hydrodynamic coupling according to claim 6, further characterized in that the at least one evacuation channel (6) opens up tangentially opposite the flow direction of the circulating flow of working medium in the case of the primary impeller (1), which is mechanically locked against rotation; and, in particular, the last section of the at least one evacuation channel (6), just before it opens up into working chamber (3) in the region of the outer circumference (3.3) of working chamber (3), is formed in primary impeller (1) in an axis-parallel manner relative to the axis of rotation of the hydrodynamic coupling.

8. The hydrodynamic coupling according to one of claims 2 to 7, further characterized in that at the end of drive shaft (4) which is located at a distance from working chamber (3),

on the front side, there is disposed a module (8) with an inner channel (9) for working medium which is circular or formed as an annular gap in cross section, at least in the region of the connection to the drive shaft (4), this channel (9) being connected to supply channel (5) in a flow-conducting manner, and an outer channel (10) for working medium which surrounds the inner channel (9) for working medium and which is shaped like an annular gap in cross section, at least in the region of the connection to drive shaft (4),

this channel (10) being connected in a flow-conducting manner with the at least one evacuation channel (6) in drive shaft (4).

9. A drive train, comprising

9.1 an internal combustion engine (20);

9.2 an exhaust gas turbine (21), which is disposed in the flow of exhaust from the internal combustion engine (20);

9.3 the exhaust gas turbine (21) is connected in a driven connection with a crankshaft, which is driven by the internal combustion engine (20);

is hereby characterized in that

9.4 a hydrodynamic coupling (22) according to one of claims 1 to 8 is disposed in the driven connection between the exhaust gas turbine (21) and the crankshaft,

wherein the primary impeller (1) can be driven by the exhaust gas turbine (21).

10. The drive train according to claim 9, further characterized in that the primary impeller (1) can be mechanically locked against rotation, so that the hydrodynamic coupling (22) brakes the crankshaft hydrodynamically.